

TO WHOM IT MAY CONCERN:

BE IT KNOWN THAT WE, JOHN P. HELY, a citizen
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5 the County of Ventura, and MARTHA M. ORTEGA, a citizen
of the United States of America, residing in Oxnard, in
the County of Ventura, both in the State of California,
have invented a new and useful improvement in

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REINFORCED WRIST BRACE WITH GANG CONNECTED MULTIPLE
STRAPS

BACKGROUND OF THE INVENTION

5 This invention relates generally to wrist braces, and more particularly to improvements in strap type wrist braces.

10 There is need for such improvements, enabling ease of attachment to and detachment from the wrist; ease of strap wrapping and tightening with respect to the wrist holder on the brace, for flexibility of that holder, but with local stiffening to be adjustably positioned for wrist bracing in response to wrapping of multiple straps about the holder and over elongated stiffeners; and for maximum comfort to the wrist and thumb of the wearer. There is also need for an
15 improved stiffened brace well adapted to wrists of different sizes and shapes.

SUMMARY OF THE INVENTION

20 It is a major object of the invention to provide an improved wrist brace meeting the above needs. Basically, the brace comprises:

a) a flexible holder to receive the user's wrist and having two flaps adapted to be closed toward

one another or toward the wrist to secure the holder about the wrist of the user,

b) a carrier associated with one flap;

c) tightening straps associated with said carrier, said straps having ends anchored by said carrier,

d) loops on the other flap to pass said straps,

e) the straps and carrier having connective material thereon whereby the straps can be pulled and tightened after passing through said loops, to adjustably press-together on the connective material on the carrier.

As will be seen, preferably three straps are provided at spaced locations along the holder, and may have ends anchored to the carrier which is associated with one of the flaps.

It is another object of the invention to provide a brace wherein the anchored ends of the straps are attached to said carrier at locations spaced along the length of said carrier.

As will be seen, the loops may be aligned lengthwise of the carrier, which itself may comprise an additional flap.

It is a further object to provide at least one stiffener carried by a flap and extending lengthwise to extend beneath all three straps.

At least two such stiffeners are preferably provided to be carried by the holder, the stiffeners spaced apart about a wrist reception zone defined proximate to or by the flaps, whereby flexible holder zones are defined between the stiffeners. At least three such spaced apart stiffeners are preferably provided, along with cushioning material carried by the holder to underlie the stiffeners. Provision is made for selective removal of the stiffeners to obtain desired close fit of the brace to a wrist, or greater brace flexibility.

Yet another object is to provide a flexible auxiliary strap connected to the holder to be adjustably folded over a zone between the user's thumb and forefinger, for adjustable connection to the holder, for firmly attaching the holder in lengthwise position on the wrist.

That auxiliary strap may carry connective material which press attaches to said connective material on the holder.

These and other objects and advantages of the invention, as well as the details of an illustrative preferred embodiment, will be more fully understood from the following specification and drawings, in which:

DRAWING DESCRIPTION

Fig. 1 is an elevation showing the front side of a wrist brace closed and fastened to the user's wrist;

Fig. 2 is like Fig. 1, but showing the rear or inner side of the brace overlying the user's palm;

Fig. 3 is a view like Fig. 1, but showing the brace in opened condition;

Fig. 4 is a view showing alternative strap support;

Fig. 5 is a horizontal section taken on lines 5-5 of Fig. 4;

Fig. 6 is a view like Fig. 3, but showing two straps wrapped to engage buckles;

Fig. 6a is a section taken on lines 6a-6a of Fig. 6;

Fig. 7 is a section taken on lines 7-7 of
Fig. 6;

Fig. 8 is a view showing the brace completely
connected to a wrist;

5 Fig. 9 is a perspective view of a stiffener;

Fig. 10 is a section taken on lines 10-10 of
Fig. 8;

Fig. 11 is a section taken on lines 11-11 of
Fig. 10; and

10 Fig. 12 is a plan view taken on lines 12-12
of Fig. 11.

DETAILED DESCRIPTION

15 In the drawings, for example Fig. 11, the
illustrated wrist brace 10 includes a flexible holder
11 sized to receive the user's wrist 12. The holder
includes two flaps adapted to be closed toward one
another to secure the holder about wrist 12. See for
20 example flaps 13 and 14, which are vertically elongated
and extend to the front side of the holder seen at the
back of the wrist in Fig. 1. The flaps may
alternatively be tightened toward other portions of the
wrist. A stretchable web 95 interconnects 13 and 14,

to protect at the outer side of the user's hand. The holder is generally C-shaped or U-shaped in cross section as seen in Figs. 3 and 7, and has side extents 15 and 16, and a rear extent 17. The holder may consist of flexible durable synthetic sheet material.

Flaps 13 and 14 may typically be stiffened as by vertically elongated stiffeners 18 and 19 received in pockets 13a and 14a; holder side extent 15 may typically be stiffened as by vertically elongated stiffener 20 received in vertically elongated pocket 15a; and holder rear extent 17 may typically be stiffened as by vertically elongated stiffener 22 received in vertically elongated pocket 17a. Such pockets and stiffeners are typically at the outer side of the holder to enhance user wrist comfort. Flexible regions or zones of the holder are shown at 23-26 in Fig. 7, in alternation with the stiffeners pockets, and these accommodate opening and closing of the holder relative to the wrist. Regions 23-26 are vertically elongated, and region 25 defines a non-stiffened pocket between fabric layers 25a and 26b. A resiliently compressible pad 27 is received in that pocket. Preferably, resiliently compressible pads are located in pockets at the inner side of the holder fabric,

opposite the stiffeners, as shown. See pad 30 in pocket 30a; pad 31 in pocket 31a; pad 32 in pocket 32a; and pad 33 in pocket 33a. Such locations of the vertically elongated pads and pockets leaves holder fabric zones 23, 24, 25 and 26 free to flex, accommodating closing about the holders wrist, despite the provision and operation of multiple stiffeners and pads.

As referred to, tightening or retention straps are associated with the flaps 13 and 14, as seen for example in Fig. 6, there being at least one first strap 40 having an anchored end 40a at or on a carrier flap 100, and at least one second strap 41 having an anchored end 41a at or on the carrier flap 100. A third strap 42 may be provided, as shown, with an anchored end 42a at or on the carrier flap 100. Flap 100 may be, and preferably is adjustably supported on flap 14, as by VELCRO connection, allowing variable angling of the straps. Therefore, the three straps 40-42 are gang connected to 100 which is adjustably connected to flap 14.

Also provided are:

- i) at least one first loop on the other

flap (for example flap 13) to pass said
at least one first strap, and at least
one second loop on said other flap to
pass said at least one second strap,
(see for example first and second loops
43 and 44 on flap 13 to pass a first
strap 40 and to pass second strap 41,
and loop retainers 45 and 46 as seen in
Figs. 1 and 3; and see for example third
loop 47 retained at 47a to flap 13 to
pass third strap 42);

ii) the straps and carrier 100 having
connective material thereon whereby the
straps can be pulled and tightened after
passing through such loops, to
adjustably press together on the
connective material on the anchored ends
of the straps. See connective material
such as VELCRO at 52-54 on the straps,
and at locations 55-57 on the outward
facing surfaces of strap anchoring
material. Portions of VELCRO 52-54 may
also connect to VELCRO material 58 on
the carrier 100, proximate the strap

anchored ends, upon fastening of the device to the wrist adding to strap position adjustability. Figs. 1 and 2 show such fastening, the flaps being closed toward the wrist. See also Figs. 3 and 6.

Fig. 8 also show optional provision of a thumb strap 75 and 75a carried by the holder, to wrap about the base area of the user's thumb 90 projecting from the holder. The strap portions 75 and 75a carry hook or pile material to enable thumb strap attachment to pile or hook material on the holder at 11b, after being wound about the thumb. Fig. 2 shows that pocket 17a for metallic stiffener 22 is open or openable 17b near the bottom of the holder, to enable removal of that stiffener, if desired. A short cover flap 80 attached at one end 80a to the holder, can be folded upwardly over pocket opening 17b, to close it, and VELCRO attached to holder, at 81, for retaining the stiffener in upwardly inserted position. Stiffener 22 is lengthwise bowed at 22b, as seen in Fig. 9, to fit the curvature of the user's palm, adapting to the wrist and palm configuration. Selective endwise removal of

the stiffeners from their pockets is enabled, for best fit to a wrist.

It will further be noted in the example that the anchored ends 40a and 41a of the two straps 40 and 41 are attached to the carrier 100 at two locations spaced along the length of the carrier flap, and that the anchored end 42a of strap 42 is attached to the carrier at a location offset from and between those two locations 40a and 41a.

A secondary band or strap 97 is attached to the holder to receive or extend about the projecting thumb at 98, the base of the thumb projecting through hole 76 in holder.

The loops 43, 44 and 47 are in lengthwise general alignment, to receive the straps, in selected adjusted positions of the carrier 100 adding to adjustability. See Figs. 1 and 2 and the strap and loop tightening configurations. At least one stiffener, as referred to, is carried by at least one flap and extends lengthwise to extend beneath all three straps. Preferably, at least two such stiffeners are carried by the holder, extending lengthwise thereof, such stiffeners spaced apart about a wrist reception zone defined by the flaps, whereby flexible flap zones

are defined between the stiffeners, as referred to.
The stiffeners preferably extend beneath all three
straps, and beneath cushions, as seen in Figs. 1 and 2.
The stiffeners are typically metallic. More
5 specifically, there are preferably four of said
stiffeners, there being cushioning material underlying
all said stiffeners, to cushion tightening of the brace
about the user's wrist as referred to above.

10 In Figs. 4 and 5 straps 40-42 are carried by
holder material 90; and a stiffener 91 is received in a
pocket 92.

Figs. 6, 10 and 11 show a side opening 76 in
the holder to pass the user's thumb.